Introduction

President Bill Clinton,
Speaking with Space Shuttle Crew,
February 7, 1994

In late 1986, scientists discovered high temperature superconductors (HTS). Industry around the world quickly recognized that this exciting discovery clearly had enormous technological potential. U.S., Japanese, and European researchers soon began a challenging, high stakes race to apply HTS technology.

To help U.S. industry meet this challenge, develop HTS technology, and capture the benefits of HTS electric power devices, the U.S. Department of Energy created the Superconductivity Program for Electric Systems in 1988.

WORLD RECORD

Largest Current Density

The performance of HTS wire was nearly tripled by Los Alamos National Laboratory.

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Highest Current

Current leads carrying world record current were constructed by Westinghouse Electric Company in coordination with Argonne National Laboratory.

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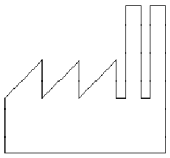
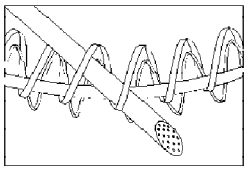
Longest Wire

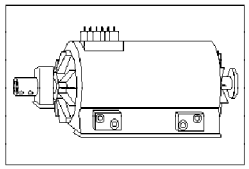
1 kilometer long HTS wires were made by American Superconductor Corporation in partnership with Argonne, Oak Ridge, and Los Alamos National Laboratories.



INDUSTRY



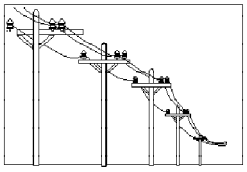
WIRES



GENERATION

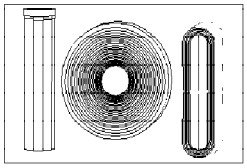
. . .IN PARTNERSHIP TO DEVELOP. . .

. . .TECHNOLOGIES TO MEET UTILITY NEEDS. . .

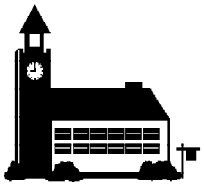


TRANSMISSION

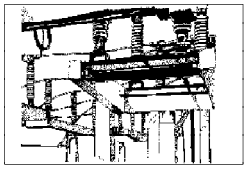
NATIONAL LABORATORIES



COMPONENTS



UNIVERSITIES



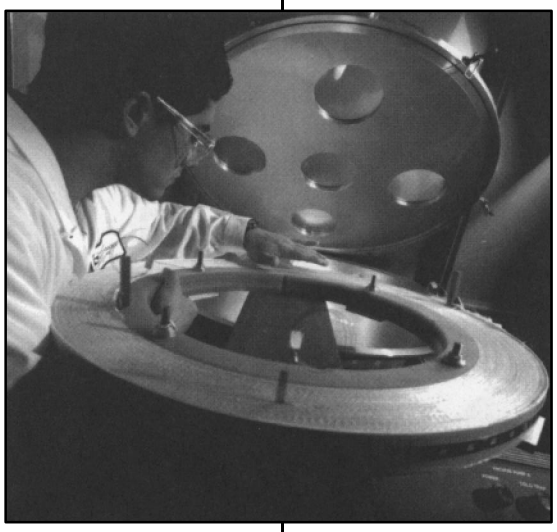
DISTRIBUTION

To ensure the rapid U.S. development of HTS technology, industry, national laboratories, and universities are linked together. Collaborative projects simultaneously develop HTS wires and systems needed for utilities to generate electricity and transmit it to users.

Electrifying the Future

To address the enormous complexity of developing HTS technology for electric power applications, the Superconductivity Program for Electric Systems marries the entrepreneurial drive of high-tech companies to the vast technological resources at the DOE national laboratories.

This program breaks new ground as a highly interactive team effort among industry, national laboratories, and universities. A strong team effort is necessary to address the staggering challenges inherent in developing electric power applications from HTS, a highly complex class of materials. The role of the DOE national laboratories and universities will be to develop underlying HTS technology which is necessary for HTS applications. Industry will then use this technology as a foundation for new products.

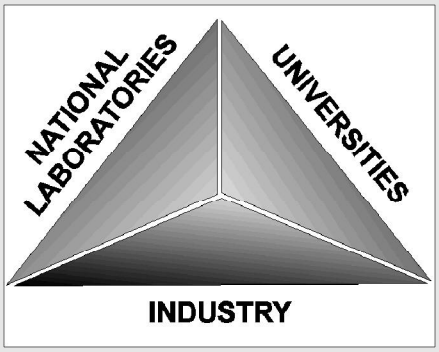


World record strength HTS coil manufactured by American Superconductor Corporation for Los Alamos National Laboratory.

As a model example of partnership between government and industry, the excellent cooperation in the program has led to astonishing progress. World records have been set (see Introduction, front) for the highest magnetic field, the highest current, the largest current density, and the longest wire ever made from HTS.

A number of companies are now selling products (see Technology Partnerships) based on processes licensed from the national laboratories. This emerging HTS industry, which did not exist in 1987, already accounts for hundreds of high-wage jobs.

Several different types of organizations are simultaneously involved in the program. Each provides specialized expertise in developing HTS technology:



- **Utilities** guide manufacturers in developing products that meet utility needs.
- **Manufacturers** produce electric power equipment that utilities need and guide national laboratories in technology development.
- **National laboratories** provide HTS technology that will assist industry in commercializing products.
- **Universities** provide basic research that supports HTS technology development.